Passenger & Freight Rail Assistance Program Benefit/Cost Analysis Instructions

The New York State Department of Transportation (NYSDOT) has created a multi-page Benefit/Cost Analysis (BCA) Spreadsheet tool to simplify the preparation of a Benefit/Cost Analysis to support applications for NYSDOT's Passenger & Freight Rail Assistance Program (PFRAP). The tool is designed to accommodate most of the project types for which NYSDOT receives applications in the PFRAP program; track rehabilitation or construction, bridge rehabilitation / replacement, rail industrial sidings, intermodal and trans-load terminals and clean diesel locomotives. For projects that don't fit the pre-defined calculations, NYSDOT has included a page for the Applicant to enter user defined benefits and costs not included in the other pages of the spreadsheet. NYSDOT acknowledges that other investment types are eligible for PFRAP funding and the limitations of the BCA Spreadsheet tool in no way limit eligibility under the PFRAP program.

All Applicants are required to prepare and submit a BCA analysis with their PFRAP application. **Use of the BCA Spreadsheet tool to prepare the BCA analysis is optional.** Regardless of the tool used to prepare the BCA for a project, NYSDOT highly recommends that Applicants submit a narrative to accompany their BCA calculations. The narrative should summarize the BCA analysis, document the source of user-entered data and any modifications to NYSDOT pre-populated formulas and values, and summarize any additional assumptions.

Most of the required data is entered by Applicants on the first three tabs of the spreadsheet. The following tabs automatically calculate different components of the BCA analysis and compute the overall BCA for the project. The methodology follows the guidance provided by the US Department of Transportation (USDOT) and the Federal Railroad Administration (FRA).

Applicants should refer to NYSDOT's PFRAP program guidance with respect to the use of confidential business information in the preparation of the BCA analysis.

Applicants are solely responsible for the contents of their applications. By using the BCA Spreadsheet tool, the Applicant acknowledges that NYSDOT makes no representations or warranties of any kind, whether express or implied, with respect to the BCA Spreadsheet tool.

Tab 1 – User Entered Data

The Applicant will need to enter data into the Yellow-highlighted boxes. The Green-highlighted boxes have been pre-populated with USDOT/FRA or NYSDOT preferred values. Applicants may change the values in the green boxes if there is a justifiable reason for doing so and the change is documented in the Applicant's BCA narrative.

Applicant Legal Name	Same as used on the Application
Short Title of Project	Same as used on the Application
Project Completion Year	Year the project is anticipated to be completed
Total Project Capital Cost	Same as used on the Application

Rail Tons, Base Year	Total revenue tons in base year (Waybill data)
Rail tons, without Project	Typically the same as above
Rail tons, with Project	Expected tons resulting from the project
Rail carloads, Base Year	Total revenue carloads in base year (Waybill data)
Rail carloads, without Project	Typically the same as above
Rail carloads, with Project	Expected carloads resulting from the project
Rail Miles, base year	Total revenue miles in base year (Waybill data)
Rail Miles, without Project	Typical the same as above
Rail Miles, with Project	Expected rail miles resulting from the project

Rail Circuity is the assumption that it takes more rail miles to move a carload from origin to destination than it takes highway miles for a truck to serve the same origin-destination pair. Although this value could range between 1.1 and 1.5, the FRA recommends a 1.4 ratio – meaning that the rail mileage is 40% greater than the truck mileage. Applicants may use actual origin-destination mileage. Use of values other than the value provided should be documented in the BCA narrative.

Annual Rail Traffic Growth Rate is an FRA recommended value and is generally assumed to be 1.3%. This is a long-term growth number. If the commodity mix on your railroad over the last 10 year period has provided a different long-term value, then that value may be used. Use of values other than the value provided should be documented in the BCA narrative.

Average Truck Loads per Carload, according to the FRA, is 3.5 trucks equal one railroad car. Trucks can typically handle about 25 tons of commodity, but certain trailer types may cube out or weight out before they reach optimum. Values between 3 and 4 can be used here. Use of values outside that range should be documented in the BCA narrative.

Weighted Congestion Cost/Truck Mile is the additional labor and fuel and travel time costs associated with traversing these counties because of travel delays.

> *For example, your customer truck routinely travels the 100 miles between Ripley and Batavia on the Thruway. About 50 miles of this trip would be in Erie County. Erie County has a $1.05 per mile highway congestion cost which when multiplied by the 50 miles would be $52.50. When averaged out for the entire 100-mile trip, this works out to $0.52 per mile. If the truck travels to and from other destinations, the counties they travel through would need to be tallied up.*

The differing congestion costs need to be combined proportionally and an appropriate value entered onto the cell. Data for out-of-state counties is not readily available, however comparisons could be drawn. (i.e. Washington DC, Chicago, Philadelphia and Baltimore have delays that greatly resemble those found in New York City. Springfield, MA and Harrisburg, PA could be compared to Rockland County.) Values selected for highway congestion costs outside New York State should be documented in the BCA narrative.

The **Percentage of Rail Traffic Growth Diverted** from the Highway is the difference between diverted truck tonnage and additional new rail traffic.

For example, what if the rail tonnage doubled as a result of the project? If this growth was fully obtained by truck diversion, then the percentage value entered would be 100%. If the doubling of tonnage was a result of 2/3 truck diversion and 1/3 new rail traffic, then the value entered would be 66.7%.

The **Highway Travel Time Savings – Other** is for projects that anticipate diverting existing truck traffic from highways to rail, as noted in the section above (Percentage of Rail Growth Diverted). The time it usually takes for a truck delivery should be input for the Travel Time per Trip without Project, and the proposed travel time it would take for that same delivery to be made by rail should be input for the Travel time per Trip With Project. **Highway Travel Times** should be averaged and the value entered into the spreadsheet. The total number of annual trips diverted from trucks to rail should be entered onto the cell.

Additional instructions for Clean Diesel Locomotive Projects:

If applying for a clean diesel locomotive project, the Applicant is only required to complete the top four (4) yellow-highlighted cells: Applicant Legal Name, Short Title of Project, Project Completion Year, and Total Project Capital Cost. Applicants should then refer to Tab 8 – Air Quality – Locomotives to supply specific information about the existing and proposed locomotive fleet. Tab 12 – Calculation Summary will compute the required BCA value.

If a proposed green locomotive project is bundled with additional rail work (such as track, bridge, and/or culvert repairs), then Applicants must complete all highlighted cells in Tab 1, and all other applicable Tabs.

Additional instruction for Tourist Railroad Projects:

While this application is designed primarily for freight projects, it may also be used for Tourist Railroad projects using the information provided below. Data can be stated in either one-way trips or round trips but must be consistent. **Rail Traffic Estimates** may be computed using existing and projected passenger information. To calculate **Rail Tons**, multiply the total Passengers carried by an assumed weight of 150 lbs. per passenger. **Rail Carloads** is the total number of revenue passenger cars hauled. Only Revenue trains may be counted; only cars in actual revenue service may be counted. **Rail Miles** is the total revenue miles operated hauling passenger trains. Presuming the proposed project will grow ridership, the "Rail Miles, With Project" quantities should be inflated to reflect the anticipated growth projection.

It is assumed that Tourism projects will not remove existing truck traffic from highways, therefore the Rail Traffic Growth Diverted from Highways and the Highway Travel Time Savings cells would remain blank.

Applicants should show projected future maintenance costs on Tab 2 – Capital Costs.

Applicants should use Tab 11 – User-Defined Benefits page to show potential Tourism benefits to the surrounding area.

Tab 2 – Capital Costs

The Project Completion Year and the Total Project Capital Cost (from Tab 1 – User Entered Data) will automatically populate the first row of the table. The rest of the years in the Year column will automatically compute for the future 29 years following the project completion. This follows the USDOT's Benefit/Cost guidance with an assumed 30-year life cycle. In addition to the initial project cost, there is also projected capital maintenance or renewal costs that are needed to keep the project facilities in a state of good repair over the 30-year analysis period. Applicants should assume industry accepted standards and procedures for developing estimates for capital renewal or replacement needs.

Capital assets used in railroads and ports generally have useful lives of 10 or more years. For assets that are long-lived, there are usually necessary repairs or replacement of assets at various time points during its expected life. These "Capital Replacement and Renewal" costs need to be estimated and entered into the appropriate cells by the Applicant. The Applicant is expected to utilize industry-standard repair and replacement cycles that are appropriate for the project facilities in developing both the cost estimates and the timing of these investments. Applicants should enter the renewal costs, in today's dollars, in the appropriate yellow highlighted cells for the pertinent years. Not every row needs to have data provided. Data entered into this Table will automatically populate cells in Tab 12 – Summary of Project Benefits & Costs and Calculation of Project Benefit/Cost Ratio. Tab 12 will automatically inflate the renewal cost into future costs.

Example:
Track projects should include additional work that will be required in future years to maintain the project investment. Typically track will need to be tamped about every 5 years. Some additional ballast will likely be needed about every 10 years, as will the rehabilitation of some grade crossings. It is also a presumption that 1/3 of the ties get replaced every 10 years.

Example: Track Rehab Project (Cost values shown are fictitious and are only for illustrative purposes)

Year	**Future Example Capital Replacement or Renewal Activity**	**Capital Replacement and Renewal of Project Funded Assets**
2029	Cost to tamp track	$250,000
2034	Replace ties, add ballast, tamp and replace Grade Crossings	$500,000
2039	Cost to tamp track	$250,000
2044	Replace ties, add ballast, tamp and replace Grade Crossing	$500,000
2049	Cost to tamp track	$250,000

Example: When projects include buildings, it can be expected that a roof will be replaced every 25 years, and HVAC units will be replaced every 18 years.

Example: Warehouse truck to rail project (Cost values shown are fictitious and are only for illustrative purposes)

Year	Future Example Capital Replacement or Renewal Activity	Capital Replacement and Renewal of Project Funded Assets
2027	Replace damaged rolling door	$10,000
2033	Replace lighting with more energy efficient lights	$5,000
2040	Replace HVAC unit with more energy efficient unit	$15,000
2047	Replace Roof	$75,000

Applicants should provide a brief narrative explaining the estimates and timing of the Capital Replacement and Renewal costs.

Tab 3 – Operating Costs

Some projects may have additional operating costs that can be avoided by the completion of a project. These might include a variety of marine costs, intermodal transfer costs, highway escort fees, highway excess size or excess weight permit fees, Per Diem fees, etc.

These should be fully stated for the base year. Future years should be the approximate cost difference between not doing the project and doing the project. Applicants should enter the operating costs, in today's dollars, in the appropriate yellow highlighted cells for the pertinent years. Not every row needs to have data provided. Data entered into this Table will automatically populate cells in Tab 12 – Calculation Summary. Tab 12 will automatically inflate the operating cost into future costs. Please provide a narrative that explains these operating costs.

Tab 4 – Traffic Projections

This page requires no user input as it is automatically calculated based on the Applicant's data entered on Tab 1 – User Entered Data. Factors calculated in this table will automatically populate cells in Tab 5 – Truck Travel Time Savings, Tab 6 – Truck to Rail Diversion, Tab 7 – Air Quality - Truck to Rail, and Tab 9 – Highway Safety Benefits.

Tab 5 – Truck Travel Time Savings

This page requires no user input as it is automatically calculated based on the Applicant's data entered on Tab 1 – User Entered Data and the factors automatically calculated on Tab 4 –

Traffic Projections. Results calculated in this Table will automatically populate cells in Tab 12 – Calculation Summary.

Tab 6 – Truck to Rail Diversion

This page requires no user input as it is automatically calculated based on the Applicant's data entered on Tab 1 – User Entered Data, the factors automatically calculated on Tab 4 – Traffic Projections, and the factors automatically calculated on Tab 7 – Air Quality - Truck to Rail. Results calculated in this Table will automatically populate cells in Tab 10 – Sustainability Benefits and Tab 12 – Calculation Summary.

Tab 7 – Air Quality - Truck to Rail

This page requires no user input as it is automatically calculated based on the Applicant's data entered on Tab 1 – User Entered Data and the factors automatically calculated on Tab 4 – Traffic Projections. Results calculated in this Table will automatically populate cells in Tab 12 – Calculation Summary. Several USDOT / EPA provided values are provided along the top of the table.

Tab 8 – Air Quality - Locomotives

This page contains 5 tables; however, only 2 of the tables (Existing Locomotive Fleet and Proposed Locomotive Fleet) require user input. The remaining 3 tables are automatically calculated and do not require any user input. Applicants are advised to place entries in the proper table and under the appropriate Tier heading. Applicants will typically have older Uncontrolled or Tier 0 locomotives. Rebuilt locomotives will typically be Tier 3 or Tier 4 after rebuilding.

Within the highlighted "Locomotive Type" cell of both the Existing and Proposed Locomotive Fleet tables, there is a drop down that allows Applicants to select either **Switcher** or **Line Haul** locomotives**.** The Applicant will enter the total annual number of hours that the locomotive(s) operated and will also provide the total gallons of fuel that the locomotive(s) consumed.

Results calculated in the tables of this tab will automatically populate cells in Tab 10 – Sustainability Benefits and Tab 12 – Calculation Summary.

Tab 9 – Highway Safety Benefits

This page requires no user input as it is automatically calculated based on the factors automatically calculated on Tab 4 – Traffic Projections. Results calculated in this Table will automatically populate cells in Tab 12 – Calculation Summary.

Tab 10 – Sustainability Benefits

This page requires no user input as it is automatically calculated based on the factors automatically calculated on Tab 6 – Truck to Rail Diversion and Tab 8 – Air Quality - Locomotives. Results calculated in this Table will automatically populate cells in Tab 12 – Calculation Summary.

Tab 11 – User-Defined Benefits

If the Applicant has additional benefits that go beyond the fuel, time, and environmental benefits that are accounted for elsewhere in this document, then those benefits should be included in this table. Examples might be tourism revenue, reduction in traffic congestion, higher value land use, etc. It will be up the Applicant to monetize the annual benefit(s) and supply a written explanation of the benefits that provide either source data or a mathematical explanation of their monetizing process. Applicants should enter the project benefit costs, in today's dollars, in the appropriate yellow highlighted cells for the pertinent years. Data entered into this Table will automatically populate cells in Tab 12 – Calculation Summary. Tab 12 will automatically inflate the costs into future costs.

Tab 12 – Calculation Summary

The Calculation Summary page presents the results from all the other pages and calculates the Benefit/Cost Ratio as well as the Net Present Value for the costs and benefits that are part of the analysis. Following FRA and TIGER recommendations, these measures are reported for both the 3% and 7% levels. Users are not required to input any data on this page, as it draws all of its information from the other tabbed sheets. Upon completion of the rest of the tables, Applicants should transfer the 3% Benefit/Cost value, noted at the bottom of the sheet, to their PFRAP application.

Applicants must attach this BCA Excel spreadsheet and a supporting narrative when submitting their final application.

Tab 13 – NYSDOT Data

This page requires no user input. Information from this tab automatically populates cells in various other tables.